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EXAMINER

VU, QUANG D

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2811

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,525

Applicant(s)

CHAU ET AL.

Examiner

Quang D Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 07/28/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30,32,36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30,32,36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11, 13 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 30 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 5,571,744 to Demirlioglu et al.

Regarding claim 30, Demirlioglu et al. (figures 1-12) teach a method of forming a semiconductor device comprising:

forming a gate electrode (26) having a first thickness on a gate dielectric layer (24) formed on a first surface of a substrate;

forming a pair of source/drain regions (46) on opposite sides of the gate electrode (26);
forming a silicon germanium film (36) having a second thickness on the gate electrode (26);

forming a silicon germanium film (36) having the second thickness on the source/drain regions (46);

forming a silicide layer (50) having a third thickness on the silicon germanium films (36);
and

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forming a pair of sidewall spacers (30) having a first height (a height measured from a top portion of sidewall spacer to a bottom portion of sidewall spacer which is in direct contact with the source/drain region) above the substrate surface on opposite sides of the gate electrode (26), wherein the first height is greater than the sum of the first and second and third thicknesses on the gate electrode (see figure 12).

Regarding claim 36, Demirlioglu et al. teach the gate electrode (26) comprises polysilicon (column 3, line 42).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 32 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,571,744 to Demirlioglu et al. in view of US Patent No. 5,168,072 to Moslehi.

Regarding claim 32, Demirlioglu et al. differ from the claimed invention by not showing the sidewall spacers (30) comprise silicon nitride. However, Moslehi teaches the sidewall spacers (60) comprise silicon nitride (figure 5; column 12, line 60 – column 13, line 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Moslehi into the method taught by Demirlioglu et al., since the nitride spacer defines the dimensions of the gate and prevents

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impurities from coming directly into the channel. Additionally, it prevents any bridging between the source/drain regions and the gate.

Regarding claim 37, Demirlioglu et al. differ from the claimed invention by not showing the sidewall spacers are less than 300 angstroms in width. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the sidewall spacers are less than 300 angstroms in width, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

Applicant's arguments filed 07/28/03 have been fully considered but they are not persuasive.

It is argued, in page 4 of the remark, that Demirlioglu et al. do not teach or suggest forming a pair of sidewall spacers having a first height above the substrate surface on opposite sides of the gate electrode, wherein the first height is greater than the sum of the first and second and third thicknesses. This argument is not convincing because Demirlioglu et al. teach forming a pair of sidewall spacers (30) having a first height (a height measured from a top portion of sidewall spacer to a bottom portion of sidewall spacer which is in direct contact with the source/drain region) above the substrate surface of opposite sides of the gate electrode (26), wherein the first height is greater than the sum of the first and second and third thicknesses (figure 12).

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It is argued, in page 4 of the remark, that Demirlioglu et al. do not teach or suggest the claimed invention of claims 32 and 37. This argument is not convincing because of reasons stated in rejection above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv
September 4, 2003

Sara W Crane
Sara Crane
Primary Examiner